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U24 Publication of Utility Model Application H02-48118

Title of the Device : The air cleaner which has the honeycomb-type element
Application : S63-128212 Sep.30,1988
Creator of Device : Yoshio Ishii, Shoukichi Niijima
Applicant : Tsuchiya Seisakusho Ltd.

Specification

1. Title of the Device : The air cleaner which has the honeycomb-type element.

2. Claim of Utility Model

The air cleaner has the honeycomb-type element which is firmly fixed in the cylindrical part in the case..

The case has the inlet & outlet pipes, the conical parts which are between the inlet & outlet pipes and the cylindrical part, and the cylindrical part.

The conical parts slope 40 deg. or less inward from the imaginary extensions of the cylindrical part.

3. Detailed Explanation of the Device

(Industrial Applicability)

For example, this device is related to the air cleaner with the honeycomb-type element, and it is used for the air inlet system of internal combustion engines.

(Prior Art)

The structure of the honeycomb-type element 4 shown in Fig.2 is as follows.

The wave plate media 2 is piled on the flat plate media 1 . The wave plate media 2 has the hills and the dales. One side of the hills and the other side of the dales are sealed.

Such combined media is rolled up around the center core 3 ,and the end of the combined media is fixed on the outside of the coil.

The honeycomb-type element 4 is placed in the air cleaner case with

the inlet & outlet pipes.

The traditional air cleaner shown in Fig.4 has the honeycomb-type element 4 in the case 7 with the inlet pipe 5 and the outlet pipe 6 .

There are the conical parts 8 between the case 7 and the pipes 5, 6 .

The air comes in from the inlet pipe 5 of the case 7 , passes through the honeycomb-type element 4 and flows out to the outlet pipe 6 .

The air is filtrated during the process mentioned above.

(Problem to be Solved by the Device)

The air cleaner shown in Fig.4 has the conical parts 8 of which the length is as small as possible for downsizing and so on. But, in the case of extreme downsizing, there are defects as follows.

That is, the air which comes in from the inlet pipe 5 becomes turbulent, and the air-flow resistance increases. The air passes through only the inner most portion of the honeycomb-type element, and the filtration at the outer most portion of the honeycomb-type element is insufficient.

So, the filtrating performance, especially the D.H.C. (Dust Holding Capacity), comes down seriously.

(Means for Solving Problem)

The honeycomb-type element is fixed firmly in the cylindrical part between the conical parts which are connected to the inlet pipe and the outlet pipe.

And the conical parts slope 40 deg. or less inward from the imaginary extensions of the cylindrical part.

(Operation)

The air flow from the inlet pipe to the honeycomb-type element becomes adequate, that is, the air-flow resistance is minimized and the D.H.C. is maximized.

(Working Example)

The air cleaner shown in Fig.1 is related to the device, and has the honeycomb-type element 11 in the case 10 . The honeycomb-type element is the same as the traditional one.

The wave plate media 14 is piled on the flat plate media 13 , and the combined media is rolled up around the center core 12 .

The end of the combined media is fixed on the outside of the coil.

The hills of the wave plate media 14 are closed at one side and the dales of the wave plate media 14 are closed at the other side.

In this way, many fluted channels which are opened at one side and closed at the other side are formed between both ends. (Fig.2)

The case 10 consists of the inlet pipe 16, the outlet pipe 17, the cylindrical part 18 and the conical parts 19 which are connected to both sides of the cylindrical part 18 .

The buffer material 20 is inserted between the honeycomb-type element 11 and the cylindrical part 18, and the honeycomb-type element 11 is firmly fixed in the cylindrical part 18 .

The dimension of the case 10 is as follows.

The diameter of the inlet & outlet pipes 16, 17 is 90 mm, and the diameter of the cylindrical part 18 is 170 mm.

The conical parts 19 slope 30 deg. inward from the imaginary extensions of the cylindrical part 18 .

In this device, the angle of gradient mentioned above is set at 40 deg. or over.

The air comes in from the inlet pipe 16 ,passes through the inside of the honeycomb-type element 11 and flows out to the outlet pipe 17 .

The air is filtrated during the process mentioned above.

The reason why the angle of gradient is set at 40 deg. or over is as follows.

That is, Fig.5 is the diagram which shows the relationship between the value of the air-flow resistance & the D.H.C. and the angle of gradient mentioned above.

As can be clearly understood in Fig.5 , up until approximately 40 deg., the air-flow resistance is almost constant at its lower limit.

Conversely, up until approximately 40 deg., the D.H.C. is almost constant at its upper limit.

The air cleaner shown in Fig.3 is one of the working examples, and it has the structure that the length of the cylindrical part 18a is longer than the length of the honeycomb-type element 11 . The other structure of the air cleaner shown in Fig.3 is the same as the structure

mentioned above.

(Effect of the Invention)

As mentioned above, in this device, because the angle of gradient in the conical parts is set 40 deg. or less, the air flow becomes optimized, that is, the air resistance reaches and then remains its lower limit and the D.H.C. reaches and then remains its upper limit.

(Brief Description of Drawing)

Fig.1 is the sectional view of the working example in this device.

Fig.2 is the plane view of the honeycomb-type element.

Fig.3 is the sectional view of the other working example.

Fig.4 is the sectional view of the traditional filter.

Fig.5 is the test diagram which shows the effect of this device.

11 : honeycomb-type element

16 : inlet pipe

17 : outlet pipe

18 : cylindrical part

19 : conical part

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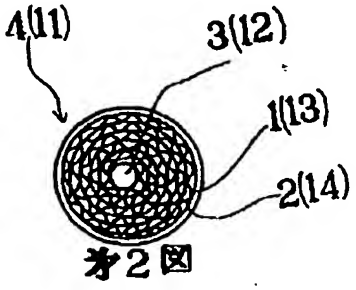

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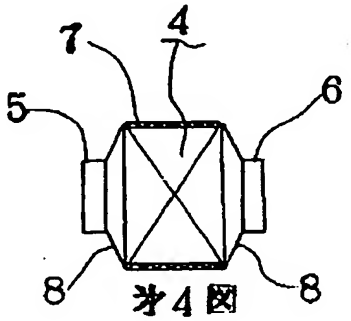

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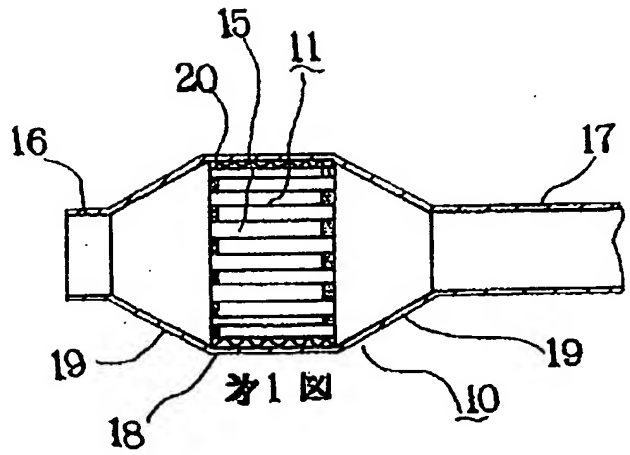

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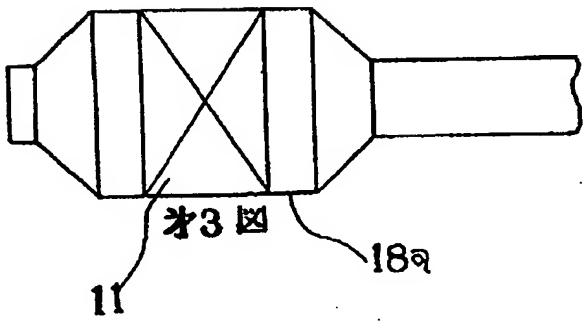

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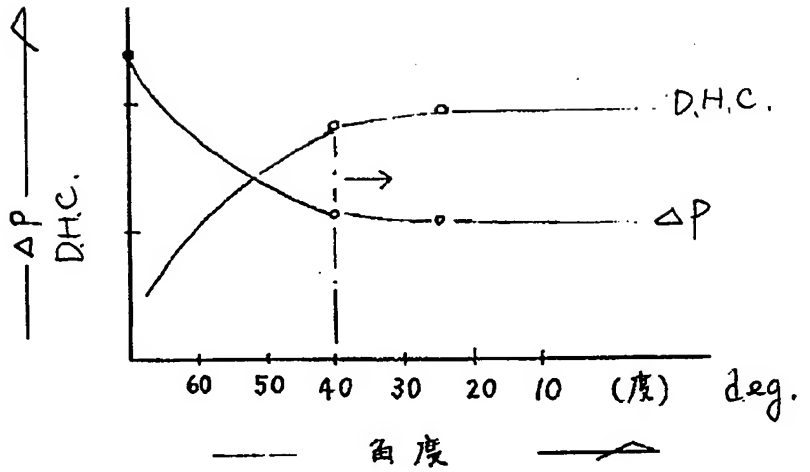

第5図

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